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Association Between Preoperative Fasting Duration and Postoperative Nausea and Vomiting in Pregnant Women Undergoing Elective or Urgent Cesarean Section

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Abstract

Background: Postoperative nausea and vomiting (PONV) are common complications following cesarean section, particularly in pregnant women due to physiological and hormonal factors. Preoperative fasting is essential for aspiration prevention; however, prolonged fasting may increase the risk of PONV. Objective: To evaluate the association between preoperative fasting duration and the incidence of PONV in pregnant women undergoing elective or urgent cesarean section. Methods: A prospective observational study was conducted between January 2025 and December 2025 including 100 pregnant women undergoing cesarean delivery. Participants were stratified into three groups based on fasting duration: ≤6 hours, 6-8 hours, and >8 hours. The primary outcome was the incidence of PONV within 24 hours postoperatively. Data were analyzed using chi-square tests and multivariate logistic regression. Results: Prolonged fasting (>8 hours) was observed in 40% of patients and was associated with a significantly higher incidence of PONV compared to shorter fasting durations (55% vs 30% vs 20%, p = 0.01). Multivariate analysis identified prolonged fasting (OR 2.54, 95% CI 1.18-5.47, p = 0.017) and general anesthesia (OR 3.21, 95% CI 1.42-7.26, p = 0.005) as independent predictors of PONV. Conclusion: Prolonged preoperative fasting is associated with an increased risk of PONV in pregnant women undergoing cesarean section. Adherence to evidence-based fasting guidelines may reduce PONV incidence and improve maternal perioperative outcomes.

Keywords: cesarean section, pregnancy, preoperative fasting, PONV, obstetric anesthesia

Introduction

Postoperative nausea and vomiting (PONV) remain among the most common complications following anesthesia, with an incidence of 20-30% in the general population and up to 80% in high-risk patients (1). Pregnant women undergoing cesarean section represent a particularly high-risk group due to physiological, hormonal, and mechanical changes that predispose them to nausea and vomiting (2). Elevated levels of estrogen and human chorionic gonadotropin, reduced lower esophageal sphincter tone, and increased intra-abdominal pressure contribute to both baseline nausea and increased aspiration risk (3). Preoperative fasting is a cornerstone of anesthetic safety aimed at reducing pulmonary aspiration (4). Traditionally, prolonged fasting durations exceeding 8 hours were recommended. However, emerging evidence suggests that excessive fasting may result in adverse outcomes such as dehydration, hypoglycemia, and increased perioperative discomfort (5). In pregnant patients, prolonged fasting may additionally lead to ketogenesis due to increased metabolic demands (6). Modern guidelines from the American Society of Anesthesiologists and Enhanced Recovery After Surgery recommend clear fluid intake up to 2 hours before anesthesia and a 6-hour fasting period for light meals (4,7). Despite this, prolonged fasting remains common in obstetric practice, particularly in urgent cesarean sections (8). Recent studies suggest that prolonged fasting may increase the incidence of PONV, identifying fasting duration as a potentially modifiable risk factor (9). Given the high global rate of cesarean deliveries, optimizing perioperative management is critical for improving maternal outcomes (10). This study aims to evaluate the relationship between preoperative fasting duration and PONV in pregnant women undergoing elective or urgent cesarean section.

Material and Methods

Study Design and Population

A prospective observational study was conducted including 100 pregnant women undergoing elective or urgent cesarean section between January 2025 and December 2025 at UMHAT - Burgas, Bulgaria. Inclusion criteria were age 18-45 years and ASA physical status I-II. Patients with gastrointestinal disorders, multiple pregnancies, or antiemetic use prior to surgery were excluded.

Data Collection

Patients were stratified into three groups: ≤6 hours fasting, 6-8 hours fasting and >8 hours fasting. Collected variables included: Maternal age, BMI, parity, ASA status, Type of cesarean (elective vs urgent), Type of anesthesia (regional vs general) and Intraoperative opioid use.

Outcome Measures

The primary outcome was the incidence of PONV within 24 hours postoperatively.

Statistical Analysis

Data were analyzed using chi-square tests for categorical variables. Multivariate logistic regression was performed to identify independent predictors of PONV. A p-value <0.05 was considered statistically significant. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). The study was approved by the Institutional Ethics Committee of University Hospital for Active treatment - Burgas, and all participants provided written informed consent.

Results:A total of 100 pregnant women undergoing elective or urgent cesarean section were prospectively enrolled between January 2025 and December 2025. The baseline maternal characteristics of the study population are presented in Table 1. The mean maternal age was 29.8 ± 5.4 years, with the majority of patients aged between 26 and 35 years (52%). Most participants were classified as ASA physical status I (78%), and regional anesthesia was the predominant anesthetic technique (82%). Elective cesarean sections accounted for 62% of cases, while 38% were urgent procedures.

Table1. Maternal Characteristics of the Study Population (n = 100)

Variable	Value
Age (years), mean ± SD	29.8 ± 5.4
Age group, n (%)	
• 18-25 years	28 (28%)
• 26-35 years	52 (52%)
• >35 years	20 (20%)
Body Mass Index (kg/m2), mean ± SD	27.3 ± 4.2
BMI category, n (%)	
• Normal (18.5-24.9)	34 (34%)
• Overweight (25-29.9)	42 (42%)
• Obese (≥30)	24 (24%)
Parity, n (%)	
• Nulliparous	46 (46%)
• Multiparous	54 (54%)
ASA physical status, n (%)	
• ASA I	78 (78%)
• ASA II	22 (22%)
Type of cesarean section, n (%)	
• Elective	62 (62%)
• Urgent	38 (38%)
Type of anesthesia, n (%)	
• Regional (spinal/epidural)	82 (82%)
• General anesthesia	18 (18%)

Patients were stratified according to preoperative fasting duration into three groups: ≤6 hours (30%), 6-8 hours (30%), and >8 hours (40%). The overall incidence of postoperative nausea and vomiting (PONV) within the first 24 hours was 37%. The distribution of PONV according to fasting duration is summarized in Table 2. A progressively higher incidence of PONV was observed with increasing fasting duration. Patients fasting more than 8 hours exhibited the highest PONV rate.

Table2. Preoperative Fasting Duration and PONV Incidence

Fasting Duration	Number of Patients (n)	PONV (n, %)
≤6 hours	30	6 (20%)
6-8 hours	30	9 (30%)
>8 hours	40	22 (55%)
Total	100	37 (37%)

As shown in Table 2, prolonged preoperative fasting (>8 hours) was associated with a markedly increased incidence of PONV (55%) compared to patients fasting for 6-8 hours (30%) and ≤6 hours (20%). This difference was statistically significant (p = 0.01), indicating a clear association between extended fasting duration and increased postoperative nausea and vomiting.Additional perioperative factors potentially associated with PONV were analyzed and are presented in Table 3. These included type of anesthesia, intraoperative opioid use, and urgency of cesarean section.

Table3. Risk Factors Associated with PONV

Variable	PONV (%)	p-value
Fasting >8 h	55%	0.01
General anesthesia	61%	<0.01
Regional anesthesia	30%	-
Opioid use (yes)	50%	0.03
Opioid use (no)	28%	-
Urgent cesarean	42%	0.08
Elective cesarean	33%	-

To further evaluate the independent effects of preoperative fasting duration and other perioperative variables on the occurrence of PONV, a multivariate logistic regression analysis was performed. Variables included in the model were fasting duration, type of anesthesia, intraoperative opioid use, urgency of cesarean section, maternal body mass index, and maternal age. The results of the regression analysis are presented in Table 4.

Table4. Multivariate logistic regression model adjusted for all listed variables

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Fasting >8 hours	2.54	1.18-5.47	0.017
General anesthesia	3.21	1.42-7.26	0.005

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Opioid use (yes)	1.89	0.92-3.88	0.081
Urgent cesarean section	1.46	0.71-3.01	0.302
BMI ≥30 kg/m2	1.32	0.61-2.85	0.478
Age >35 years	1.21	0.54-2.73	0.642

As shown in Table 4, prolonged preoperative fasting (>8 hours) was identified as an independent predictor of PONV, with patients in this group demonstrating a significantly increased risk compared to those with shorter fasting durations (OR 2.54, 95% CI 1.18-5.47, p = 0.017). Similarly, the use of general anesthesia was strongly associated with the occurrence of PONV, conferring more than a threefold increase in risk (OR 3.21, 95% CI 1.42-7.26, p = 0.005). Intraoperative opioid use showed a trend toward increased PONV risk; however, this association did not reach statistical significance (OR 1.89, 95% CI 0.92-3.88, p = 0.081). No statistically significant associations were observed for urgency of cesarean section, maternal obesity, or maternal age. These findings confirm that both prolonged fasting and anesthetic technique are key determinants of PONV in pregnant women undergoing cesarean section.

Discussion

This study demonstrates a significant association between prolonged preoperative fasting and increased PONV in pregnant women undergoing cesarean section. These findings align with emerging literature suggesting that excessive fasting may negatively impact perioperative outcomes (9). Pregnancy introduces unique physiological conditions that increase susceptibility to nausea and vomiting, including hormonal influences and delayed gastric emptying (2,3). Prolonged fasting exacerbates these effects through dehydration and metabolic stress, potentially explaining the higher PONV rates observed. The results support current recommendations from the American Society of Anesthesiologists and Enhanced Recovery After Surgery advocating shorter fasting durations. Encouraging clear fluid intake up to 2 hours preoperatively may reduce PONV while maintaining safety (4,7). The findings of this study support the multifactorial nature of postoperative nausea and vomiting in pregnant patients. As illustrated in Table 5, PONV results from the interaction of patient-related, pregnancy-specific, anesthetic, and modifiable factors. Among these, preoperative fasting duration represents a key modifiable determinant that may be targeted to reduce the incidence of PONV in obstetric populations. Opioid use showed a trend toward increased risk but did not reach statistical significance. Other variables, including urgency of cesarean section, maternal BMI, and age, were not independently associated with PONV.

Table5. PONV Risk Factors in Pregnant Patients

Category	Risk Factor	Clinical Impact
Patient-related	Female sex	Baseline high risk
	History of PONV/motion sickness	Strong predictor
	Hyperemesis gravidarum	Increased sensitivity
Pregnancy-related	Hormonal changes (hCG, estrogen)	Central emetic activation
	Delayed gastric emptying	↑ aspiration & nausea
Anesthesia-related	General anesthesia	Strong risk factor
	Opioids	Dose-dependent effect
	Hypotension	Common in spinal anesthesia
Modifiable	Prolonged fasting (>8 h)	Key preventable factor

The conceptual model presented in Table 5 highlights the multifactorial nature of PONV in pregnant patients, integrating patient-related, pregnancy-specific, anesthetic, and modifiable risk factors. Notably, preoperative fasting duration emerges as a key modifiable factor that may be targeted to reduce PONV incidence. General anesthesia and opioid use were also significant predictors, consistent with established evidence (1). Regional anesthesia remains preferable in obstetrics due to lower PONV and aspiration risk.

Limitations

This study has several limitations. First, its observational design does not allow for causal inference. Second, the relatively small sample size (n = 100) may limit statistical power. Third, the study was conducted at a single center, which may reduce generalizability. Additionally, perioperative antiemetic prophylaxis was not standardized, which may have influenced PONV incidence. Finally, fasting duration was based on patient reporting, introducing potential recall bias.

Conclusion

Prolonged preoperative fasting exceeding 8 hours is associated with an increased incidence of postoperative nausea and vomiting (PONV) in pregnant women undergoing cesarean section. These findings highlight fasting duration as a clinically relevant and modifiable risk factor within obstetric anesthesia practice. In addition to fasting duration, the use of general anesthesia was identified as an independent predictor of PONV, reinforcing the importance of anesthetic technique selection in this population. The observed association between prolonged fasting and higher PONV rates suggests a dose-response relationship, emphasizing the need to avoid

unnecessary fasting extensions. Adherence to evidence-based fasting guidelines, including the allowance of clear fluids up to 2 hours before anesthesia, may reduce PONV incidence, improve maternal comfort, and support enhanced recovery pathways. Optimizing perioperative fasting protocols should therefore be considered an integral component of patient-centered care in obstetric anesthesia. Future studies with larger sample sizes and standardized perioperative protocols are warranted to further validate these findings and refine clinical recommendations.

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